SUPERIOR COURT OF THE STATE OF CALIFORNIA
IN AND FOR THE CITY AND COUNTY OF SAN FRANCISCO
HONORABLE WINTON MC KIBBEN, JUDGE PRO TEM PRESIDING
DEPARTMENT X-5
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MILTON J. HOROWITZ, et al.,
Plaintiffs,
vs. No. 965245
RAYBESTOS-MANHATTAN, et al.,
Defendants. /

REPORTER'S TRANSCRIPT OF PROCEEDINGS AUGUST 18, 1995
JURY TRIAL VOLUME I

A P P E A R A N C E S
For the Plaintiffs: WARTNICK, CHABER, HAROWITZ, SMITH & TIGERMAN
By: MADELYN J. CHABER, Attorney at Law
For the Defendants: PREUSS, WALKER & SHANAGHER
By: CYNTHIA C. ROENISCH, Attorney at Law
SHOOK, HARDY, & BACON By: WILLIAM S. OHLEMEYER, Attorney at Law
FENTON & KELLER
By: RONALD F. SCHOLL, Attorney at Law
NUTTER, MC CLENNEN & FISH By: STEPHEN J. BRAKE, Attorney at Law

INDEX OF EXAMINATION

WITNESS - WILLIAM E. LONGO, Ph.D.

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P R O C E E D I N G S

THE COURT: Thanks for waiting. Everybody is here, so we may proceed.

MS. CHABER: We've changed courtrooms so many times, I hoped we weren't going to change judges.

Your Honor, at this time the Plaintiff would call to the stand Dr. William Longo.

THE CLERK: Please come forward and raise your right hand, sir.

WILLIAM EDWARD LONGO, PH.D.,

having been called as a witness by the Plaintiffs, was duly sworn and testified upon his oath as follows:

THE CLERK: Please state your name and spell your name for the record.

THE WITNESS: William Edward Longo, L-o-n-g-o.

THE CLERK: Plaintiffs' Exhibits 54 through 94 marked for identification.

THE COURT: All right.

(Plaintiffs' Exhibits 54 through 94 marked for identification.)

DIRECT EXAMINATION BY MS. CHABER

MS. CHABER: Q. Dr. Longo, are you a medical doctor?

A. No, I'm not.

Q. Do you have a doctorate degree?

A. Yes, I do. In engineering.

Q. And what is your area of expertise?

A. I'm known as a material scientist, and I guess also as an electron microscopist.

Q. And what is your occupation?

A. I guess I would classify myself primarily as electron microscopist.

Q. Would you review for us your educational background?

A. Yes. In 1977, I received a bachelor's of science in microbiology. In 1981, I received a master's of science in engineering. And in 1983, I finished up my Ph.D. in material science and engineering at the University of Florida.

Q. And did you have an area of specialty when you did your doctorate?

A. Yes, I did.

Q. And what was that?

A. I specialized in polymer science.
Q. Polymer?
A. Plastics.
Q. Oh.
A. Polymer science, specifically biopolymers, in which we were designing, back in those days, what used to be called smart bullets, where we would take a biological polymer, such as a polysaccharide or polyethylene, or one of those types, and attach a drug to one end of the polymer and an antibody on the other. And so if you injected it into a person, instead of going throughout the body, it would home right into the area of interest, such as cancer.
Q. What is material sciences?
A. It's a little known science, but it's very important.
Material science and engineering is basically the study of

three types of materials: polymers or plastics, which was my specialty, metallurgy or metals, and also ceramics or minerals.

And as a material scientist, we develop ways to take these materials and make new properties out of them, such as if you had an application that needed a new type of material, so it would work, you would go to a material scientist.

A good example is -- well, somebody my age, we remember when soft drink cans used to be steel with the little seam on the back, and then they went to an aluminum can. Well, a material scientist developed how to make that aluminum better so that you could mold these types of cans.

Another example would be the space shuttle. These heat ceramic tiles on the space shuttle were developed by a material scientist.

What else we do as a material scientist? One, we develop these new materials. We are also taught how to tear them apart, right down to their molecular level, to see why it improved. So if something has a new property, we like to try to explain why by using the various techniques. One of my areas was electron microscopy, so that we could magnify these things to a very high degree and actually see why there was an improvement.
Q. What are the primary tools that you use in determining if something -- what its composition is, I guess?
A. I guess the two most useful tools is electron microscopy, which would include both scanning electron

microscopy, transmission electron microscopy, as well as optical microscopes, and then we have a whole range of techniques from there.

Infrared analysis we use extensively and chromatography instruments that will tell you how hard a

material is, how brittle it is, what kind of strength it has. Instruments that will tell you what the chemistry of the surface is, just a whole wide range of techniques we are taught in graduate school to use to solve these types of materials problems.

Q. And do you also, in the course of the work that you do, determine how sound something is, whether it's degraded or corroded?

A. Yes, our company, Material Science and Engineering -- excuse me, Materials Analytical Services, excuse me, specialize in forensics analysis. We have a consulting group in two offices, one in Norcross right outside of Atlanta and one in Rawling, in which companies bring materials problems to us and ask us to solve what happened -- why did it break, why is it corroding, what is this contamination, why is our manufacturing process causing all these rejects -- and we specialize in solving these types of problems. And so we have a whole staff of different scientists who are dedicated to working on these problems.

Q. And do you use the same kinds of tools that you've just described?

A. Yes. Our laboratory has scanning electron

microscopes, transmission electron microscopes, x-ray diffraction capabilities, x-ray fluorescents, gas chromatography, infrared analysis, and a few other exotic techniques.

Q. You indicated that the name of your laboratory was material -- now I'm going to get it wrong, Material Analytical Services?

A. Yes, that's correct.

Q. And can you describe that organization?

A. It's a very small company that was started in late 1987, and it was developed initially to specialize in asbestos analysis. And over the years, it's slowly grown into a materials science-type analytical group, so we have many types of scientists at Materials Analytical Services, which would include physicists, materials scientists, biologists, microbiologists, geologists, electrical engineers, tissue specialists, as well as many technicians and support staff.

Q. Can you give us an idea about how many people are employed at -- can we call it MAS for short?

A. That would probably help me, too.

Q. At MAS?

A. Sure. We have 28 people: Five Ph.Ds, including myself, handful of people with master's of science, bachelor of science, geologist, approximately seven to ten microscopists, and various support staff.

Q. And what is your role at MAS?

A. I'm the president.

Q. Do you have any other positions besides president?

A. No, that's the only one.

Q. And what do you do as the president?

A. Well, I'm responsible for the day-to-day running of the laboratory, all the paperwork that is involved in running a company, as well as the chief technical director. I'm the one who approves the standard operating procedures on how we do tests, what projects we will take in, who do we assign to a specific project, what scientists will work on it, budgets, that sort of thing.

Q. Do you still yourself look through the electron microscope?

A. Yes. Not as much as I used to, but I probably average -- at least once or twice a week I'll actually do some analysis.

Q. Do you review the analyses done by other people in your group?

A. Yes, all the tests are done under my direction, all the reports I review, especially any type of materials project which is not, as I call it, routine, in which we are involved in helping the client solve some problem, which may take some time.

Q. Okay. What was your employment before MAS came into existence in 1987?

A. Before that, I was with a company called Micro Analytical Laboratories, which I started in 1984 and did pretty much the same thing. During the time I was with Micro Analytical Laboratories, I was also working at the

University of Florida in the material science department. There I started as -- received my degree and started as a postdoctoral associate, and was eventually promoted to visiting assistant professor while I was involved in this other company.

Q. What were you teaching at that point?

A. I would teach some of the laboratories and help with guidance on the graduate students, and I was in charge in the day-to-day running of my professor's laboratory, Dr. Goldberg.

Q. Can you tell us the kind of work that MAS does --

A. Yes.

Q. -- for the different companies you work for or different projects?

A. We do a wide range of activities, everything from asbestos analysis to -- we work for many consultants across the country -- to materials research or materials consulting, in which we've done work for IBM, Dupont, Mitsubishi, Intel, and quite a few others.

And also, we have a group that develops new types of instruments or prototypes to help analyze samples. We recently built a new type of microscope for the Intel Corporation that was installed over in Stanford.

Q. And how often do you get involved in court cases like this?

A. This year, this is the third time I've provided trial testimony, so it's been more in the past, but it's slowly dwindling down.

Q. Can you give us an idea what percentage of your time is involved in court cases?
A. My personal time is approximately ten percent.
Q. How did you become involved with asbestos analysis?
A. Well, that was back in 1984, and I was reviewing some journals where they were talking about new asbestos issues and the problem that was gripping the country and the types of analytical tools, microscopes they were using to analyze asbestos. Well, I looked at the protocols and thought that the way it should be done, or the standards, should be by electron microscopy.
Q. That had not been the standard at that time?
A. It was not the standard for air clearance by the EPA.
It was still in its infancy, so I embarked upon that route to try to make it the standard and also to try to help develop protocols.
Q. And did you work with the EPA on developing a protocol?
A. Yes, a few. I've been invited by EPA to be on their peer review group.
Q. What's that?
A. That's a group of scientists that are invited from around the country who are asked to come to EPA and review their ongoing research projects so that they have an outside
peer review group to make sure that the projects are sound,
that they are achieving the goals that they want.
And we are an unbiased, outside consultant. We've also been retained by the EPA in which we receive contracts

to develop protocols or recipes for analysis of asbestos.
Q. So you said a protocol is like a recipe?
A. Essentially, yes.
Q. And the EPA is the Environmental Protection Agency?
A. That's correct.
Q. Have you done work for any other governmental agencies?
A. We've done work for CDC, the Center for Disease Control. We typically look at viruses for them because we have electron microscopes. We recently did an interesting project for them in which we were one of the first labs to produce scanning electron micrographs of the Ebola virus, so
that caused a lot of excitement in our lab when that issue came up about four or five months ago.
We also do work for the Institutes of Health, National
Institutes of Health, which we have done research projects,
and a few others.
Q. And what does asbestos analysis involve?
A. Well, you can probably break it down to four to five types. The first is asbestos analysis of air samples in which, say, if we wanted to, we could sample some small part
of the air in this room and then send it to a laboratory like ours, and we could tell you exactly how many asbestos fibers per cubic centimeter of air was in this room, if any.

And that can go two routes: You can use the electron microscope or transmission electron microscope, which is the definitive answer, or you can use optical microscopy, which cannot tell you that you have asbestos and sometimes will

miss small fibers, so you have those two choices.

The second type of analysis is what we call bulk analysis, in which we are sent samples of building products and asked if it has asbestos in it.

Q. But somebody could send you a ceiling tile?

A. Ceiling tile, plaster sample, floor tile, fireproofing material. We've done that in literally thousands of buildings.

The next type are dust analysis, in which if you have an asbestos building product in a building and you want to know if it's shedding asbestos, say if these ceiling tiles had asbestos in it and we had dust on the surface, is that ceiling tile causing contamination in the building? That's a protocol that was recently approved by the ASTM, or the American Society of Testing Materials.

Q. That was the protocol that you, in your laboratory, developed?

A. We developed and we were in charge of shepherding that protocol through ASTM.

The next is water analysis, because there are standards for the amount of asbestos that can be in water.

And the last thing primarily is tissue analysis, where we get involved in a lot of lung tissue from people who have had or may have had exposures to asbestos, in which we do the -- what's known as the fiber burden analysis. How many asbestos fibers per gram of lung tissue.

Q. And in conjunction with that, do you then work with pathologists?

A. We provide them information. They will typically send us either whole lung or autopsy material, depending, unfortunately, on the asbestos victim, on what stage of the disease they are in.

Q. Have you written any articles that have been peer reviewed?

A. Approximately a dozen.

Q. And can you give us an idea of what the peer review process is like? You've been a peer reviewer?

A. Yes, I have.

Q. What's the process like?

A. When you develop a method or a protocol, or you've done some research and you want to present to it your peers, other scientists in the field, you will submit it to a scientific journal.

The journal will receive your manuscript and then

will
17 send it to what are known as peer reviewers. These are
18 people in your field who will review your manuscript and
19 will either stamp it yes, this is a good
20 scientifically-sound publication and work, or it's good,
but
21 it needs a little work, or they reject it outright as not
22 being scientific and not worthy of publication. That
keeps
23 the process where it allows only good, original research
to
24 get into journals.
25 Q. Can you give us the kinds of journals that you've
26 published in?
27 A. The Journal of Cancer Research, The Environmental
28 Information Association, The American Journal of
Industrial

1 Hygiene. I apologize, I didn't bring my resume, so I can't
2 remember them all. Journal of Pharmaceutical Science, I
3 believe is one, and a few others.
4 Q. Have you given any presentations to professional
5 groups or organizations?
6 A. Yes, I have.
7 Q. Can you tell us the topics that you've talked about?
8 A. Primarily it's been related to asbestos analysis.
9 Especially in the late 1980s, I was invited quite
10 extensively to provide talks on the types of protocols
11 measuring asbestos using transmission electron microscopy.
12 I've also given talks at the American Industrial Hygiene
13 Association. I have been asked to lecture at Georgia Tech
14 on asbestos analysis, and a few others.
15 Q. Have you published anything in the scientific
16 literature regarding Kent asbestos cigarettes?
17 A. Yes, we have.
18 Q. And where was that published?
19 A. In The Journal of Cancer Research.
20 Q. Okay. And I'm going to hand you Plaintiffs' Exhibit
21 54 and ask you if that is the article you referred to?
22 A. Yes, it is.
23 Q. When was that published?
24 A. In June of this year.
25 Q. Do you belong to any professional organizations or
26 groups?
27 A. Yes, I do.
28 Q. Could you give us an idea of what ones might be

1 relevant to an asbestos issue?
2 A. I belong to the American Industrial Hygiene
3 Association, I belong to the Environmental Information
4 Association, the Microscopy Society of America, the
5 Microbeam Society, the ASTM or the American Society of
6 Testing Materials. I believe that's it.
7 Q. Can you give us an idea of what groups or
8 organizations you've written protocols or these recipes
for?
9 A. Primarily two, the Environmental Protection Agency
and
10 the American Society of Testing Materials.
11 Q. And what is that society?
12 A. That's a society that's sort of a -- it's a

nonprofit
organization that involves approximately 3,000 scientists from around the world who volunteer their time to set standards of testing. And they set standards of all types of testing.

For example, if you're putting up a new building, the concrete that goes into that building will have to meet an ASTM standard for the amount of concrete and the ingredients, or a kitchen door or a cabinet on the types or times that the door will open before it will break will be an ASTM standard.

So they write standards for just about every type of consumer product there is, as well as standards for testing environmental issues. The committee I belong to is the ASTM committee involving asbestos, in which we are writing standards for the testing of asbestos in either dust or bulk or air samples.

Q. And are there counting techniques for transmission electron microscopy?
A. Yes, there is.
Q. And are there ones for scanning electron microscopy?
A. Not for asbestos.
Q. And why is that?
A. Well, the counting techniques, what it is, is when you get a sample in the transmission electron microscope, an air sample, after you've prepared it, you're only allowed to count or identify certain types of structures.

When I say structures, we see an asbestos fiber, that's one structure, or a complex structure which may be many fibers on top of each other, we will still call that one structure. So we are not allowed to try to estimate the number of fibers in that complex structure.

The scanning electron microscope does not have the resolution to see the very small fibers found in air samples, so they don't allow that to be used to count. You can use it to identify asbestos or look in bulk samples or to visualize it, but when you have the very, very small asbestos fibers in air samples, this technique, they found, is not accurate.

Q. You were going like this with your finger, indicating about an inch. Is that the size of the asbestos particles or fibers you were talking about?
A. No. That's an overexaggeration on the length.
Q. Has your laboratory been accredited by any organizations?

A. Yes, it has.
Q. What's accreditation, first of all?
A. Accreditation is where an organization will come in

and certify your laboratory as capable of analyzing types of samples. Our lab is certified by the National Voluntary Laboratory Accreditation Program, which is run by the National Institutes of Standards and Technology that was -- took on that chore from the federal government, so we are certified to analyze asbestos bulk samples, asbestos air samples, and we are also certified in many states around the country to analyze samples in those states. Like New York has their own environmental laboratory accreditation program; so does Vermont, so does Texas, and a few others.

Q. And does that mean, that scientists came into your laboratory and looked at the laboratory and your techniques?

MR. BRAKE: Objection; leading.

THE COURT: Restate it. Don't lead.

MS. CHABER: Q. How did the accreditation come about?

A. They, the National Institutes of Standards and Technology has scientists who volunteer -- not volunteer, they are actually paid, to go out and visit your laboratory, once every two years, and to look over all your data. They make you pull files, they look at all the microscopes, they they make sure the calibrations were done, they give tests to all the microscopists, they look at your quality assurance program. It's very extensive.

They also send out, every two-and-a-half months, a

testing sample that they ask you to analyze to see if you've done it correctly. So it's a fairly extensive program.

Q. That happens every two-and-a-half months?

A. Yes.

Q. And have you ever lost accreditation?

A. No.

Q. Does MAS every advertise its services?

A. Yes, it does.

Q. And where has it advertised its services?

A. Well, probably the most extensive advertising was done five to six years ago, in which we had a series of ads that were running in two magazines. One was called Asbestos Issues and one was called Envirocon, or something like that.

Q. Called what?

A. Envirocon. I can't quite remember because it's not run there anymore. We stopped that about five years ago.

Q. Okay. And what was the nature of the ad?

A. Well, at that time, there was a severe price drop in samples for asbestos, and we felt there was labs out there that were cutting corners.

Our laboratory, we feel, and we are bragging a little bit, is one of the best in the nation for doing this work, so we are very proud of that fact, so we developed an ad that was telling people that if you sent samples to our laboratory, the job would be done right and we wouldn't be

afraid to defend that work, even in court.
Q. And did you ever get any attorneys calling you as a result of those ads?

A. No, even though it showed us standing in a courtroom, it wasn't designed for attorneys, it was designed for consultants who send out air samples who want to be -- have a good feeling about the ad. If the questions or our tests were ever called in question, we would be able to come and do this today.
Q. And you have, though, testified as an expert witness?
A. Yes, I have.
Q. Besides today, obviously?
A. Yes, I have.
Q. And can you give us an idea of the range of clients who have asked you to testify?
A. We have testified on behalf of building owners who --
in which we have developed, as a forensics lab, we developed the ability to take bulk samples that contain asbestos and identify who manufactured it, so we could --
Q. How do you do that?
A. Well, it's sort of like -- it's a forensics test. It's really no different than what the FBI may do to identify a paint chip, because most manufacturers have their own secret recipe. They try to outdo the other manufacturer, so they try to put different things in there.
And once you have the ingredients or the protocols of how they made it, as a materials scientist, we can break it down, match it to the ingredients, and tell you who manufactured it. So we can tell you a ceiling tile, if it has asbestos, who manufactured it, what years, and sometimes even what plan it came out of.

Q. Really, it's that detailed?
A. Yes. That's one type.
We get involved in these types of cases here.
We also testify on behalf of asbestos manufacturers in which they want to have testimony on some of my opinions.
We've worked for insurance companies, just a wide range of people.
Q. And with respect to being asked by asbestos manufacturers to do work for them, in fact, you've been asked in a case that I have, and I may get the opportunity to cross-examine you one day; is that right?
A. That's correct.
Q. Have you ever been involved in the preparation of any standard -- excuse me -- yes, in the preparation of any standards for the preparation -- excuse me. Let's start that question over again.
Have you been involved in preparing any standards for the prevention of contamination of air by asbestos?

A. One of our primary functions at the laboratory is to measure asbestos in the air, and one of the things we also do is we get involved in how to keep asbestos out of the air, to reduce contamination.

During abatement processes where they will go in and take asbestos out of the building, they will typically isolate it and put negative air machines in there. That is, they are pulling air out of this containment area so that any asbestos release is pulled through this machine. They use high-efficiency filters, and we were asked some time ago

to look at those filters and help develop what would stop asbestos.

So the day-to-day function of our laboratory involves the extensive use of all types of filtering apparatuses to either trap asbestos, either stop it, or release it.

Q. And in the course of that work, do you look at the filters and how well they function?

A. Yes.

Q. In a given year, can you estimate the number of samples you and your laboratory have analyzed?

A. I think we average about 10,000 samples a year.

Q. What do you do in your laboratory to make sure that there's no contamination?

A. We have special hoods where all the samples are open, and these hoods are negative-flow hoods through HEPA filters, high-efficiency particle filters, so if anything ever spills or opens up, that's collected.

We also run air samples inside the lab from time to time to make sure there is no background air. We take dust samples. We are very diligent to make sure that contamination is not an issue. Every sample we run, set of samples, we always run lab blanks.

Q. What's a lab blank?

A. Well, if you have an air sample that has been collected out in the field and you analyze it and find asbestos, you want to run a lab blank along with it that's not collected in the field, that was just opened in your lab, to make sure there's no asbestos on that, so that you

know the asbestos you found in the sample out in the field really came out in the field and wasn't something you did in the laboratory.

Q. And is that something that you do on a regular basis?

A. Every set of samples that goes through the lab that are prepped at one time. You don't have to run it for every sample, because you may prep ten samples at once, so you run one sample for that.

Q. And have you had any experience analyzing materials like cotton?

A. Yes, we have.

Q. What type of a material is cotton?

A. Well, cotton is a polysaccharide, or a complex

organic
14 molecule, and it's essentially -- it's cotton. It's a --
I
15 would call it a biopolymer.
16 Q. Is that the same type of substance you were talking
17 about that your doctoral dissertation involved?
18 A. Biopolymers, yes.
19 Q. And what about crepe paper?
20 A. We've analyzed paper materials. We've done a lot of
21 consulting work for various companies who manufacture
paper
22 products.
23 Q. What paper companies have you consulted for?
24 A. Georgia Pacific is a really big one. Kimberly Clark
25 is one. So we've done work for those companies.
26 Q. And what is cellulose acetate?
27 A. Cellulose is a polysaccharide and cellulose acetate
is
28 a synthetic fiber in which they take a cellulose material

1 and they essentially put an acetate group on it. So it's a
2 chemical reaction that makes what's known as a synthetic
3 fiber.
4 Q. Have you looked at those types of materials, cotton,
5 crepe paper, cellulose acetate, regarding their propensity
6 to degrade or corrode?
7 A. Yes.
8 Q. And what is the propensity -- I guess we should take
9 them one at a time -- of cotton?
10 A. Well, unless there's an outside agent, that is,
11 something that attacks the cotton such as acid or extreme
12 cycles of moisture and heat, cotton will not degrade. It
13 just doesn't self-destruct.
14 Q. Unless you throw it in the washing machine?
15 A. Well, it shrinks, changes weave.
16 Q. What about the crepe paper?
17 A. Again, that's a cellulose material. It's paper.
18 Unless you have active agents attacking it, it will not
19 self-destruct. It doesn't have -- there's no reason, or
20 scientific reason, for these things just to degrade on
their
21 own.
22 Q. Would that be true for the cellulose acetate, as
well?
23 A. Especially for cellulose acetate. That's an
extremely
24 stable polymer.
25 Q. Yesterday we heard a little bit about electron
26 microscopy. What type of machine does your lab use?
27 A. Well, we have two. We have two brands, one's a
28 Hitachi transmission electron microscope, and then we have

1 four what's known as JEOL 1200 EXes transmission electron
2 microscopes, all state of the art.
3 Q. Okay. I'm going to show you Plaintiffs' Exhibit 55.
4 Is that one of them?
5 A. That's one of them.
6 Q. What is it?
7 A. That's a J-e-o-l, we call it Jeol 1200 EX.
8 MS. CHABER: I would move this in evidence.
9 MR. OHLEMEYER: No objection, Your Honor.

THE COURT: All right. What did you say the number was?
MS. CHABER: 55.
(Plaintiffs' Exhibit 55 received in evidence.)
MS. CHABER: And Your Honor, if I don't break it, I think he's going to let me use this.
Q. And is that the electron microscope that you were just describing?
A. Yes, that's one of them. That's Mr. Will Stark, who's looking in the microscope, and where he's looking through those binoculars is where the image is formed in the transmission electron microscope.
But the actual sample is placed in the middle of the column. If you go up about a foot above Mr. Stark's head, you can see all that apparatuses up there, and that's where the sample actually sits.
Q. So the sample is in the part above?
A. Yes. So the electron beam and these instruments work at about 100,000 volts. The electron beam comes down and

goes through the sample and forms an image on a fluorescent screen. Sort of like an x ray. So you have x rays going through your hand and then putting an image on a film. These electrons go through the sample and put an image down on the fluorescent screen.
Q. And then do you have capabilities at your laboratory to turn what you see under the microscope into photographs?
A. Yes, all these instruments have cameras associated with them so you can capture the photomicrograph of what you're looking at.
Q. And is that something that gets done regularly at the laboratory?
A. Yes, it does.
Q. Are you familiar with the RCA model electron microscope used in the past?
A. Yes, I am, very familiar.
Q. And how are you familiar with it?
A. We actually have it as a museum piece sitting in our lobby. We restored it, have all the original documentation. We are quite proud of that instrument. There's only two or three of them left in the country, and we have one of them.
Q. And what year is that machine?
A. That was manufactured in 1952.
Q. And it's not in use today, is it?
A. No, it's not.
Q. And how does it compare with what you just showed us?
A. Well, actually, the microscope uses the same physical principles, but it had some deficiencies, such as doing

electron diffraction patterns, and it wasn't very efficient

in running samples through.
It also couldn't work at the very high magnifications that we can work at now. I think the limit of that one was about 40,000 times. Our new electron microscopes typically can go easily up to one to two million times. So they weren't quite as powerful, but the use of an electron beam through a sample onto a flourescent screen works the same way.
Q. And you said that it wasn't -- it didn't perform as well with respect to diffraction patterns?
A. That's correct.
Q. And what are diffraction patterns?
A. A diffraction pattern -- an electron microscope, again, pushes an electron beam through a sample. If the material is crystalline, has crystals in it, such as an asbestos fiber, one of the things that happens is the electron beam is diffracted through the crystals so it gives you a spot pattern that's characteristic of the type of crystals you're examining, so it's a very good technique for identifying crystal materials.
Q. And what were the failings of the RCA model with respect to diffraction patterns?
A. Well, it was very hard to standardize the height, because you have to know a lot of things about the diffraction pattern in order to analyze it. And also, the size of the electron beam was too big to get individual crystals. So it made it a very confusing pattern that would

take a lot to interpret today's standards.
Q. You were talking about transmission electron microscopy which -- does that get abbreviated?
A. TEM.
Q. And scanning electron microscopy?
A. SEM.
Q. What's the difference between their abilities to visualize asbestos fibers?
A. There's a fundamental difference. Both use an electron beam, but a transmission pushes it through the sample, so you get almost a shadow of the image, such as an x ray, where the scanning actually scans the beam over the sample and you just look at the surface. So one instrument is used to look at the interior of materials and the other one is used to look at the surface. So it gives you much more detail to what the surface looks like.
Q. And which is which?
A. TEM, transmission, is through the sample; scanning is the surface of the sample.
Q. And do you ever use scanning electron microscopy to look at issues of degradation or corrosion?
A. It's one of the primary tools, yes.
Q. And have you done any analysis as to whether electrostatic forces affect the release of asbestos from materials?
A. Yes.
Q. First of all, what are electrostatic forces?
A. Well, static charge, it's the charge on a surface of

a

material, and it's the ability of that charge to hold it to another surface. So for example, if this pen has a surface charge like asbestos fibers and it's laying flat on a surface, the electrostatic charges are very high, or the forces are very high, and it's very hard to pull that fiber off the surface.
However, if you get multiple structures sitting on top of each other and you don't have it laying flat across, the electrostatic forces are very low, and it's easy for the fiber to be released.
Q. And is there a principle in science that deals with the issue of the release of fibers from electrostatic forces?
A. It's just surface chemistry on what the charge is on the surface versus the charge of another surface and the relative attraction of the two, yes.
Q. Is there a principle of reentrainment, as it relates to asbestos fibers?
A. Yes, there's an area that we've studied extensively.
Q. And what is that?
A. If I have dust on a surface and it's contaminated with asbestos, we have measured the ability of small forces it takes to cause that dust to be reentrained, or to get back up into the breathing zone of an individual to where you may breathe what's in the dust.
Now, we know that the fibers right on the surface are very hard to come up, and the ones that have the less electrostatic forces are easily reentrained.

Q. Have you and your laboratory been involved in testing Kent cigarettes?
A. Yes, we have.
Q. And when did you examine your first Kent cigarette in any manner?
A. It was in the middle -- sometime in the middle of 1989.
Q. How did that come about?
A. I was contacted by an individual named Dr. Slade, who said he had original Kent cigarettes that may contain asbestos, and he wanted to know if I would like to analyze these cigarettes to see if, indeed, they did have asbestos or not, and what type of asbestos and the concentrations.
Q. And what kind of doctor was Dr. Slade?
A. He's a medical doctor.
Q. Did you, at that time, have any knowledge of any association with lawyers?
A. No, I didn't.
Q. Did you later learn that Dr. Slade had been associated with some lawyers in looking at that issue?
A. Yes, I did.
Q. At the time you performed analysis, that was not something you were aware of?
A. No, I wasn't.
Q. Did you eventually get the cigarettes from Dr.

Slade?
A. Dr. Slade visited our laboratory and brought the cigarettes with him.
Q. Which lab? You have two.

A. The one in Atlanta.
Q. And did you eventually inspect these cigarettes?
A. Yes, we did.
Q. What did you do?
A. Well, we analyzed the cigarettes using a technique called polarized light microscopy.
Q. What's that?
A. It's an optical microscope that uses polarized light to identify crystalline fibers. It's the standard technique used by the Environmental Protection Agency to look at asbestos in bulk samples.
Q. In bulk samples?
A. Correct.
Q. Is it used for looking at asbestos in, for example, air samples?
A. No. Polarized light, or PLM, is not allowed to be used for that.
Q. What about in tissue analysis?
A. No.
Q. At the time that you inspected the cigarettes in 1989, did you make any record of that inspection?
A. Yes, we did.
Q. And what did you do?
A. We videotaped the opening of the cigarettes and the actual analysis performed by the microscopists.
Q. Subsequent to that, has that videotape been made available to the attorneys for Lorillard and Hollingsworth and Vose?

A. Yes, it has.
Q. When you first got the packs, what did you do?
A. Well, we --
MR. OHLEMEYER: Excuse me, Your Honor. Can we have some description of who "we" is?
THE COURT: Sure.
MR. OHLEMEYER: Maybe identify people more specifically.
THE COURT: Sure.
MS. CHABER: Q. Dr. Longo, Dr. Slade came down to your laboratory?
A. Yes, he did.
Q. Did you meet with him?
A. Yes, I did.
Q. Were there other people involved?
A. Yes, Dr. Mark Rigler.
Q. And who's he?
A. He's now our vice president of Materials Analytical Services, MAS.
Q. What was he then?
A. He was the Atlanta branch manager at that time, I believe.
Q. And so it was Dr. Slade, you, and Dr. Rigler?
A. And the analyst who did the analysis was Mr. Bill Eglund, who was a relatively new associate at that point.

Q. Was he being supervised?
A. Yes.
Q. When you first got the cigarettes from Dr. Slade --

first of all, what did Dr. Slade come down with?
A. Dr. Slade came down with six packs of Kent cigarettes that were over a range of years of their manufacture.
Q. And how was it able to be determined what years of manufacture these cigarettes were?
A. By looking at the package, you can look at tax stamps or the types of warnings that were put on. So my understanding of that is that every time some new regulation went into effect, or a type of warning was told to be put on the cigarette, you can actually date the packs. And also, the tax stamps that were put onto the cigarettes.
Q. And were you able to determine the different years of the cigarettes?
A. Yes.
Q. The cigarette packs?
A. Yes, we were.
Q. Were these opened or unopened packs?
A. These were unopened. The packs were in their original condition.
Q. When you say "original condition," can you describe the original condition?
A. Well, the cellophane was intact. There was no observation of any damage to the packs, no discoloration. There was no intrusion into the cellophane that we could see visually. The foil that was under the cellophane was intact, so to me, they looked like cigarettes, especially the originals that somebody would have gone out and just bought.

Q. And of the six packs of cigarettes, can you give us an idea what the packs were?
A. I'm sorry.
Q. There were six packs of cigarettes?
A. Correct.
Q. Could you give us an idea of the years of the packs and any other identifying information?
A. Packs one and two turned out to be the original Kents from about the 1954 to 1955 era, or known as tax stamp series 125. Those contained crocidolite asbestos.
The other four packs, we had no tax stamp, prewarning, which my understanding is the next generation. Then we had a caution label, which I understand was developed in January of 1966. And then we had a warning label was January 1, 1970 pack. And then we have pregnant warning label, which is in October 1984. So it was sort of a range of years.
Q. Okay. This is Plaintiffs' 56.
THE COURT: What number, again?
MS. CHABER: 56, Your Honor.

Q. And what is that that we are looking at in Plaintiffs' 56?
A. That's an original Kent, so that is one where the filter would contain crocidolite.
Q. And this is 57.
A. That's just it flipped over, the back view.
Q. And 58 and 59?
A. We have two side views.
Q. Either side of the pack?

A. Correct.
Q. These did not have warnings on them, did they?
A. No.
Q. And what's that?
A. That's just the top of the pack. Typically, where people would open the cigarettes. And that's the bottom of the pack.
Q. And is this the tax stamp that you were referring to? Exhibit 60?
A. I believe so, yes.
Q. And apparently there's some way to find out from tax stamps what year, which is the year of manufacture?
A. Those early years, yes.
Q. And what were the size of the series 125, the first pack, the one we just showed?
A. That was the 70 millimeter.
Q. Was there a second pack that was a different size?
A. The 85 millimeter, so two lengths of the cigarette itself.

MS. CHABER: I would move these into evidence, Your Honor.

MR. OHLEMEYER: Just a couple, Your Honor.

VOIR DIRE EXAMINATION BY MR. OHLEMEYER

MR. OHLEMEYER: Q. Dr. Longo, do you know who took those photographs?
A. I don't recall exactly who, no.
Q. And is this a photograph of the pack of cigarettes that was actually used in your experiment?

A. No.

MR. OHLEMEYER: No objection, Your Honor.

THE COURT: All right. They will be admitted.

(Plaintiffs' Exhibits 56 - 61 received in evidence.)

CONTINUED DIRECT EXAMINATION BY MS. CHABER

MS. CHABER: Q. Are these photographs substantially similar to the pack of cigarettes used in your experiment?

MR. OHLEMEYER: Your Honor, I object to the question as being vague. I think the question -- I guess I think it's a vague question.

THE COURT: Sustained.

MS. CHABER: Q. Plaintiffs' Exhibit 60 shows a package of Kent cigarettes. Is this package substantially similar to the ones that were tested?

MR. OHLEMEYER: Well, we don't have a foundation for that. If the question is, does this picture look like the pack, the appearance, that's fine. Substantial similarity is a different question.

THE WITNESS: Yes, all the packs that we, of the original Kents, when I say "original Kents," the ones containing the asbestos, were all in this type of

condition,
22 all in excellent condition, in my opinion.
23 MS. CHABER: Q. And the package that is depicted
24 there in Plaintiffs' Exhibit 60 -- 56, rather, what's the
25 year of that?
26 A. That's a '54, '55, 1955 package of Kent cigarettes.
27 Q. All right. And what cigarette was examined in 1989,
28 from what year?

1 A. That one right there.
2 Q. Can you tell us how you went about opening and
3 examining the cigarettes?
4 A. Well, the package was opened, again, under a negative
5 flow hood. If it did have asbestos in it, we, of course,
6 wanted to make sure we protected everybody. And it was
7 opened with a scalpel, and then a cigarette was withdrawn
8 with, I believe it was some tweezers. At that point, it
was
9 then further analyzed for the amount of asbestos present.
10 Q. And what did you use to analyze it?
11 A. Again, we used the common technique used in the
12 Environmental Protection Agency, and that's polarized
light
13 microscopy.
14 MR. BRAKE: Your Honor, with respect to this series
of
15 answers, the witness keeps referring to "we," and I wonder
16 if we could discover whether he has personal knowledge,
17 whether he did it, or whether someone else did it.
18 THE COURT: Clarify that.
19 MS. CHABER: Q. Were you present during the time
20 that the cigarettes were examined?
21 A. Yes, I was. I was the one who personally opened the
22 cigarettes. And then I supervised Mr. Eglund, who did the
23 analysis. I was present.
24 Q. And we've marked as Plaintiff's 62 --can you tell
us
25 what that is?
26 A. That is an open pack of the original Kent cigarettes
27 showing the filter end of the cigarettes.
28 Q. And is that what the cigarettes looked like when the

1 pack was opened?
2 A. Yes. And it shows the type of structure or the look
3 of the asbestos-containing Kent cigarettes.
4 Q. Now, you indicated that after you opened this, a
5 cigarette was taken out?
6 A. Yes.
7 Q. And the cigarette that was taken out by your
8 assistant?
9 A. Mr. Eglund -- I took the cigarette out. Mr. Eglund
10 did, who is a mineralogist, geologist, master level, did
the
11 optical analysis using polarized light to identify if any
12 asbestos was present.
13 MS. CHABER: Somehow one didn't get marked.
14 I'd move Plaintiffs' Exhibit 62 into evidence.
15 MR. OHLEMEYER: I think it may already be in
evidence,
16 Your Honor. No objection.
17 THE COURT: All right.

(Plaintiffs' Exhibit 62 received in evidence.)
THE CLERK: Plaintiffs' Exhibit 95 marked for identification.
(Plaintiffs' Exhibit 95 marked for identification.)
MS. CHABER: Q. What are we looking at here? First of all, what's the source of this picture?
A. This is a close-up of the Kent cigarette, the original Kent cigarette, showing the actual top of the filter and the construction of this filter. You can see, just about see, all the ingredients that make up this filter.
Q. Can you give us an idea what we are looking at? May

the witness step down, Your Honor?
THE COURT: Sure.
MS. CHABER: I think the jury's mainly watching that screen.
THE WITNESS: This is the side of the filter. And here we have the crepe paper. This gives it the rigid structure of the filter. And here we have the various fiber material. The fiber material besides the crepe paper was basically three types. You had the cellulose acetate fibers, you had the cotton fibers, and you had the crocidolite asbestos. And it's very hard to see.
MS. CHABER: Q. Maybe if I zoomed a little.
A. If you could move it down a little bit, maybe. I think we can see it there.
If you look closely, you can see there's actually two shades of blue in these filters. The lighter blue is the cellulose acetate filters, and then mixed in here, if you look at it closely, you can see some darker blue material, and that's actually the asbestos, which is crocidolite asbestos. And crocidolite asbestos is known to be the blue asbestos.
So it was sort of sporadic in where it was found, but that is a close-up of the filter.
Q. Did it appear, the crocidolite asbestos, appear to be evenly distributed in the filter?
A. No, it was not.
Q. And then what was done after it was looked at under the -- is this optical polarized?

A. No, that's just -- it's a special camera we have that has a lens on it that will magnify it. It's equivalent of a low-powered optical microscope.
MS. CHABER: I would move 95 into evidence.
MR. OHLEMEYER: Two questions.
VOIR DIRE EXAMINATION BY MR. OHLEMEYER
MR. OHLEMEYER: Q. Dr. Longo, what's the magnification on that?
A. That's approximately ten times.
Q. And was that -- when was that picture taken?
A. I think approximately I think in 1990 -- '89-'90.

I'm
12 not quite sure.
13 Q. Was it taken in connection with the initial
14 examination to determine whether there was asbestos in the
15 filter, or was it taken in connection with your subsequent
16 examination in 1991?
17 A. The subsequent examination, 1990.
18 MR. OHLEMEYER: Thank you, Your Honor. My objection
19 is for the reasons previously stated.
20 THE COURT: All right. Overruled.
21 (Plaintiffs' Exhibit 95 received in evidence.)
22 CONTINUED DIRECT EXAMINATION BY MS. CHABER
23 MS. CHABER: Q. So in this first analysis or, I
24 guess -- you've looked at these cigarettes, analyzed Kent
25 cigarettes on more than one occasion?
26 A. Yes.
27 Q. And if we take that picture that we just showed in
28 Plaintiffs' 95, are there other magnifications or other

1 means of looking at it to get an idea where the asbestos is
2 in this?
3 A. Yes. We went to the next technique, which was
4 scanning electron microscopy, in which we then tried to
5 observe and see how the asbestos is distributed in the
6 filter. The scanning electron microscopy gives you a
better
7 view on where the crocidolite asbestos is in the filter.
8 Q. And Plaintiffs' Exhibit 63 through 67?
9 A. I don't know if it would be possible, but it might be
10 helpful if you could get both photos up there at the same
11 time, the optical one as well as that, so we could just
put
12 a road map on where we are between the two. I think that
13 will help
14 Q. Okay.
15 A. Should I step down?
16 Q. Yes, I think it will be a little easier. If you
need
17 me to zoom into it, I will.
18 A. Here, again, is the optical. And if you look
closely
19 here, you can see this structure, which is the crepe
paper.
20 If you look over here, you can see this same structure.
So
21 we are actually looking at the SEM, scanning electron
22 microscope, of the exact same area.
23 I think we can pull the optical one out and then
look
24 at that one by itself.
25 Q. Okay.
26 A. Now, what again we have, we have the crepe paper.
27 Could you just reduce that a little bit?
28 Q. Okay.

1 A. We have the two, three types of fibers, but if you
2 look closely, you can now see that we have these really
3 bright areas. The crocidolite asbestos is crystalline. It
4 has more density. And under the scanning electron
5 microscope, it will look brighter than will these organic
6 fibers.

I think we can go to the next one. And what we are going to do is we are going to increase the magnification.
Q. So that was 50 times?
A. If you could pull it up. It's 50 times plus, if you take into account that this has been an enlarged photo; that's approximately 200 to 300 times magnification.
Q. Okay. This is Plaintiffs' 64.
A. Now we are going up in magnification. If you could just push it up a little, I think we can -- so we can see the magnification on the bottom.
Q. Okay.
A. Now we are at 100 times, so we are at approximately 500 times, and you can start seeing a little bit more detail of these bright areas. If you could move it over a little bit.
You can start seeing the bright fibrous nature, because we are getting up in higher magnification of the actual crocidolite that's present right at the surface of the filter. Again, understand that this is a mixture all the way through the filter, so that you'd have crocidolite at the start of the filter all the way to the end. And when you make these mixtures, it doesn't segregate anywhere, it's

just where it's mixed.
Q. So now we are at, this is Plaintiffs' 65?
A. We are at 300 times, so we are approximately 1200 times, and we are going to focus in on this one area which has a large, what I would call a bundle of crocidolite that's sort of attached onto -- on the organic fibers. Most likely, that's the cotton or the cellulose acetate.
Q. Those big spaghetti-like things?
A. The organic fibers of the cotton and the cellulose acetate is typically about 100 times bigger in diameter than the crocidolite. The crocidolite is very thin. These organic fibers are very wide when compared to each other. So we are probably -- we are going to go up and focus on that.
I think that's magnified 1,300 times, so that magnification is about 4,000 times with the blow-up, and you can start seeing the individual fibers that make up this large crocidolite area. If you could move it just over a little bit the other way.
Now, here we see crocidolite asbestos sticking onto either the cotton or the cellulose acetate fibers. And these fibers are pretty much laying flat on this surface. Now, the electrostatic forces it would take to remove these fibers would be very high, the force to overcome the electrostatic forces. So those, I don't believe, would be probably released during the smoking experience.
On the other hand, these that stick out in the space are attached very loosely, and because of the size of these

structures, I don't believe it would take very much force

at
all to release those structures.
Q. That was Plaintiffs' 66.
What is this?
A. Reduce the magnification. We are at 7,000 times, so we are looking at this photo at approximately 30,000 times. And what we are looking at now is that same thing we just saw with a very high magnification, and you can see these individual fibers that make up these rather large bundles, and that's how all asbestos bundles or large asbestos structures are formed. They are made up of literally thousands of these small individual fibers. That just shows how the structure of the crocidolite is.
Q. Now, were there other views taken of the cigarette other than from -- I guess this was on top looking down?
A. Right. We also took a side view. Instead of looking at the filter this way, we also looked at it to the side to see what might be sticking above the filter.
THE COURT: I wonder if we can interrupt and take a 15-minute recess.
Please bear in mind the admonitions given to you before, that you're not to form an opinion about the case, you are not to discuss it, either amongst yourselves or with anyone else. Return at 11:15, please.
(Recess taken.)
THE COURT: We are all back together, so please resume the examination of the witness.
MS. CHABER: Thank you, Your Honor. Just so I don't

forget, I'd like to move into evidence Plaintiffs' 63 through 67, which were the photomicrographs we looked at.
MR. OHLEMEYER: For the reasons previously stated, Your Honor.
THE COURT: Yes, overruled; may be admitted.
(Plaintiffs' Exhibits 63 through 67 received in evidence.)
MS. CHABER: Q. Dr. Longo, just so that there's no confusion, maybe we should talk about the different packs of cigarettes and what was analyzed when and by what means, and maybe you could even do a chart that would help us keep this straight, which cigarettes were looked at and in what ways from visual to, I guess, transmission or scanning electron microscope.
A. There's essentially two types of cigarettes we analyzed: The original Kents, the 1955 70 millimeter, which is what we are showing here in the optical pictures, as well as the --
Q. That, Plaintiffs' Exhibit 95?
A. As well as the scanning electron microscopy analysis.
Q. The ones that we just looked at a few minutes ago?
A. That's correct. Those cigarettes also were the ones

23 initially analyzed to show us if it had asbestos or not, so
24 those are the ones that we opened in 1989, did the analysis,
25 found the asbestos, identified crocidolite. Later in 1990,
26 we took those photographs.
27 Now, the analyses were done on where the smoking tests
28 were done, MAS-1, was done on the 1952 70-millimeter

1 original Kent, the first year they were manufactured. We
2 visually inspected them and in our opinion, they were the
3 same as the others. We did not take the scanning electron
4 microscopy photos as well as the optical of those.
5 Q. And why not?
6 A. We didn't have -- they are very rare cigarettes. If
7 you put them in and do these types of analyses with them,
8 like this, that essentially destroys the cigarette. Since
9 they looked the same to us, they don't have the
10 discoloration, we wanted to conserve the cigarettes we had
11 and just test them.
12 Q. So did you visually inspect the 1952 cigarettes?
13 A. They were visually inspected by Dr. Mark Rigler, by
14 Jeannette Taylor, and also by myself.
15 Q. And then a comparison was made with what was looked at
16 in 1955?
17 A. That's correct.
18 Q. And as a result of the comparison, what did you
19 conclude was the similarity between the cigarettes?
20 A. They were in the same condition, which was excellent,
21 in our opinion.
22 Q. And I think you had mentioned earlier that there was
23 an 85-millimeter cigarette?
24 A. Yes, sir -- yes, ma'am, excuse me.
25 Q. I get accused of a lot of things, but not usually
26 that.
27 A. I apologize.
28 Q. And this was Plaintiffs' 35. Is that the

1 85-millimeter cigarette?
2 A. Yes, it is. You can see the king size stamp
3 present -- printed on the package.
4 Q. So going back to the '55 cigarette, which was the one
5 that was analyzed with the scanning electron microscope?
6 A. Yes.
7 Q. You had started to indicate, before we took the lunch
8 break -- the break, that the cigarette had been looked at
9 from the side angle, or the filter, rather?
10 A. That's correct.
11 Q. And this is a series 68 to 73. What are we looking at
12 here?
13 A. We are looking at the side view of the 1955 Kent
14 cigarette.
15 Q. Can you orient us a little? Maybe you could step down
16 again.
17 A. Sure.

Q. Here is the wrapping on the filter. This was taken at 25 times, so the magnification is approximately 100 or so. Here's the edge of the filter, and here we have protruding from the filter the three types of fibers we were talking about, the organic fibers, which is the cellulose acetate, and the cotton, and these real bright areas are the crocidolite.

Now, the distance, even though this looks like a lot, the actual distance, because we are magnifying over a hundred-some-odd times, is actually only around a half millimeter or so, so it's not really sticking up above the

filter that far.
Q. Would you be able to see that visually?
A. It would be very tough, just with my eyesight.
Q. Did you look at that and make any comparisons with nonasbestos-containing cigarettes?
A. Yes, we did.
Q. And what did you conclude from that?
A. That various brands, the organic fibers that are used today, protrude above the filter. So this cigarette is not unusual to have fibers protruding slightly above the filter.
Q. And can you actually see asbestos fibers there?
A. Well, the very bright areas are the crocidolite asbestos. But because of the size of the fibers, you have to go to much higher magnification, actually, to resolve the fibers or see them.
Q. That was Plaintiffs' 69. And let me just put the magnification up there first.
A. That's 50 times, but this has been enlarged, so the actual magnification is around 200 times. And now you can start making them out a little bit. The dark fibers, again, the organic, or cellulose acetate.

Then we see these bright areas, and that's where the crocidolite asbestos is. What we are going to do is go up in high magnification of that one area.

Q. All right.
A. Again, we are at about 4- to 500 times. Move it down just a little. And we are focusing in on this area. And you can start making out the actual individual fibers at

this magnification.
Q. Plaintiffs' -- that was 70. This is 71.
A. This is about 1200 times, with the blowup, and you can see the individual -- start to see the individual, actual individual fibers that are present. And I believe we have one more. You can see these fibers. Again, if you look, you can see these little smaller, much smaller fibers. The magnification is about 5,000 times. So these are very loosely associated structures here that, in my opinion, could easily be released. And then you have these large bundles and complex structures, and that's all crocidolite.
Q. And then 73 is --

A. That's at 28,000 times. And again, the higher the magnification, you actually start seeing the individual fibers. 28,000 magnification, 28,000 times is about the range we routinely use when we do -- analyze air samples, 25,000 times, because these are the very thin and very smallest fibers, and you cannot resolve these unless you get to those very high magnifications.

MS. CHABER: I'd move into evidence Plaintiffs' Exhibits 68 through 73.

MR. OHLEMEYER: Same objections, Your Honor.

THE COURT: Overruled. They may be admitted.

(Plaintiffs' Exhibits 68 through 73 received in evidence.)

MS. CHABER: Q. Did you review a patent relating to this cigarette?

A. Yes.

Q. And can you describe what the patent says about how the asbestos is in the filter?

A. It was, I believe the words were, "loosely packed" or "loosely associated." I can't -- it was loosely something. I can't quite remember the exact language on it. And actually, it was a description of all the fibers, the way it was manufactured.

Q. And the electrostatic forces that you talked about earlier on those pictures that we just looked at of the end protruding, in your opinion, are there fibers demonstrated there that would not be held in by electrostatic forces?

MR. OHLEMEYER: Objection, Your Honor; leading.

MR. BRAKE: Leading.

THE COURT: Restate the question.

MS. CHABER: Q. What impact do you believe electrostatic forces would have on fibers that you saw in the side view of the cigarette?

A. Some would be held, some would not. So it would be my opinion that these fibers would and could be -- could and would be released during the smoking process.

Q. And do you know what the forces necessary to dislodge the fibers would be?

A. We don't -- I haven't calculated the exact pounds per square inch on the force, but the forces that we used in the smoking experiments would -- did dislodge these fibers. And usually it's measured in pressure. And what we used was approximately 12 to 15 millimeters of mercury, or what's the vacuum it takes to raise a column of mercury.

We measured the individuals in our laboratory who smoked, at that time there used to be five or six, and hooked up an apparatus so when they inhaled, what type of force did they put onto the cigarette, which was 20 -- they averaged 25 millimeters of mercury.

The women who smoked was around 12 to 15; the men

were
25 to 30. The forces we used in these smoking machines were
approximately 12 to 15 millimeters of mercury. So those forces were adequate enough to release the fibers, crocidolite fibers, from these filters.
Q. Now, what percentage of the total asbestos in the filter are likely to -- you know, we will be looking at the end, I guess?
A. Extremely small. We measured the concentration of asbestos in the filters, and the weight of the asbestos was approximately ten milligrams of crocidolite. What we are seeing represents an extremely small amount of the total concentration of asbestos because, again, we are just looking at the surface of the filter. That crocidolite is through the entire filter itself.
Q. And what were the constituent parts of the filter, from your review of the patent?
A. Cellulose acetate, cotton, crocidolite was mentioned in one, and the crepe paper. So the construction of the filters, as we examined them, was described, and the ingredients were described in these patents.
Q. And in examining the unsmoked filter, did you examine each of these components to determine whether or not there

had been any deterioration or degradation of the materials?
A. Yes.
Q. And what did you conclude?
MR. OHLEMEYER: Objection, Your Honor. Lack of foundation.
THE COURT: Overruled.
THE WITNESS: Using the scanning electron microscope, which gives you nice surface characteristics, it was our opinion that these fibers, number one, crocidolite can't degrade unless you heat it up to 7-, 800 degrees centigrade, or a very strong acid.
And the organic fibers, the surfaces looked like, to us, that they were in pristine condition. There was no evidence that we could find that showed any degradation of these materials.
MS. CHABER: Q. And do the types of materials, the cotton, the crepe paper, and the cellulose acetate, do they degrade just as a function of time?
A. Spontaneously, no. They are stable molecules. Unless something else attacks it, they will not degrade.
Q. Now, you don't know, do you, the precise history of the packs of cigarettes that Dr. Slade brought?
A. No, I don't.
Q. How have you satisfied yourself that those cigarettes were not deteriorated or degraded?
A. We don't know the history of the cigarettes, what happened to them during the time span. But we do know, whatever happened to them, caused no problem. So if there

were temperature changes, if there was increased or decreased moisture to wherever they may have been located, there was no evidence that any of these cigarettes had any degradation.

So in fact, it's almost immaterial what happened to them up to the point that we got them, because, in our opinion, these cigarettes were in excellent condition.

Q. And were the outer parts of the packages in good condition?

A. Yes, they were.

Q. Did you see any evidence of holes or tears or rips in the cellophane?

A. When we examined them visually, no.

Q. Were there any tears or rips or holes in any of the aluminum foil that could be seen?

A. We couldn't see any.

Q. And did you see any tears or rips or holes in the cigarette package itself?

A. No.

Q. And when you took the cigarette out of the pack, did it fall apart in any way?

A. No. They behaved like a cigarette.

Q. Now, after this test in '89, there was additional work done in what year? When was the next time you did anything again with Kent cigarettes?

A. Well, there's a sequence of events.

Q. Why don't you explain that to us.

A. In 1989, when we first received the cigarettes, we

examined them and determined yes, indeed, these original Kents had crocidolite asbestos. The next thing we did was send four of these cigarettes off, the 1955s, to the American Health Foundation to be smoked in a smoking machine.

Q. Now, what's a smoking machine?

A. A smoking machine is a device that will smoke a cigarette in a very reproducible manner. That is, it takes a known volume of air, usually 35 cc's, and does -- and takes eight puffs, and does it exactly the same way each time. And it's used primarily to measure from types of cigarettes to types of cigarettes the amount of tar and nicotine.

So that if a manufacturer produces a cigarette, they will use this technique by the Federal Trade Commission to see exactly how much tar and nicotine comes out of the cigarette. So it's a measure of cigarette to cigarette to cigarette on how much tar and nicotine.

Q. So that the cigarettes can be compared?

A. Yes.

Q. And what happened when you sent the four cigarettes -- first of all, about how many cigarettes are you aware of that exist of Kent asbestos cigarettes?

A. I'm currently only aware of four packs. One pack has 60 cigarettes, one pack has been depleted -- I think there's maybe one or two cigarettes left -- and as we sit here today, I'm only aware of approximately 40 original Kents

in
28 existence.

1 Q. And do you have access to all of these?
2 A. I don't have access to any of them.
3 Q. So you took four cigarettes from the 1955 pack and
4 sent them off to the American --
5 A. Health Foundation.
6 Q. Health Foundation to be smoked?
7 A. Correct. We wanted to see if the cigarettes would
8 indeed release crocidolite asbestos during the smoking
9 process.
10 Q. And what happened after you sent them off?
11 A. They were run and --
12 Q. You weren't there during the course of that?
13 A. No, no, I was not there. That was -- I want to make
14 sure I pronounce his name correctly -- that was Dietrich
15 Hoffman, who I believe is in charge of the American Health
16 Foundation. We sent him special filters to place into the
17 smoking machine to collect the crocidolite, if it was
18 released.
19 Q. Why did you send him special filters?
20 A. Because the smoking machine uses what's known as a
21 Cambridge filter. That's designed only to capture tar and
22 nicotine and particulates. It is not designed to capture
23 asbestos.
24 Q. Okay. So what happened next?
25 A. We weren't present during the test. He sent back
the
26 filters.
27 Q. Did they videotape that test?
28 A. No, they did not. So we have very little
information

1 on what happened during the test, other than he said he
2 followed the protocol. We now know what happened, but at
3 that point, we didn't know exactly how they were smoked.
4 Q. What happened?
5 A. Well, we prepared it using their standard protocols
6 and went and examined them in the electron microscope to
see
7 if we could determine any asbestos fibers.
8 Q. And what did you discover?
9 A. The filters were severely contaminated with glass
10 fibers.
11 Q. Now, when you say "the filters," we can get very
12 confused here because we are talking about cigarette
filters
13 and what other kinds of filters?
14 A. It might be helpful if I just drew a diagram to keep
15 it straight, there's so many different filters.
16 Q. All right.
17 A. This is probably a bad drawing of a cigarette with
the
18 filter. And then it goes on to a -- this cigarette is
19 smoked, and this is in a smoking machine. The smoke would
20 come through and get trapped on this filter. This is a
21 mixed cellulose ester filter, and it's routinely used for
22 this analysis.
23 Q. For which analysis?
24 A. For asbestos analysis. This filter has all this

material all over it, all the tars and nicotines, et cetera.
It has to be ashed. So we have to remove all the excess organics; otherwise, we can't visualize it in the transmission electron microscope.

Q. What happens if you were to look at it with the tar and nicotine?
A. The TEM is a very powerful microscope, but electrons are very weak. If I have a single fiber, I can see it. If I have six or seven or eight fibers on top of it, it blocks the electron beam. It would be just like having ten hands under an X-ray machine: you wouldn't be able to see anything, so we'd have to get it down to a level we can see.
This is known as the indirect analysis. So this filter is ashed.
Q. Is that an accepted technique scientifically?
A. Yes, it is.
Q. And are there any protocols or standards for using indirect methodology to analyze asbestos?
A. There's two protocols that now use the indirect analysis. The Superfund protocol, or measuring asbestos concentrations at Superfund sites by the Environmental Protection Agency, and the ASTM just recently finalized a protocol that uses the indirect analysis.
Q. Did you, in your laboratory, have anything to do with those protocols?
A. The indirect analysis of soil samples by the Environmental Protection Agency for Superfund sites, we won the contract for that and provided that protocol to EPA.
It's ashed, and when we say ashed, it's a low-temperature plasma ash that just burns off the organics at very low temperatures, basically at room temperature, 70 degrees.

Q. Does it disturb the asbestos?
A. No, it does not harm inorganics. If you want to remove the organics and leave the inorganics, you use a plasma asher. This is placed in a solution that is mixed, so you get a nice distribution, and then it's refiltered onto another MCE filter, so that now, instead of having this unanalyzable mass of material, I can have a nice filter that has particles all over it.
Q. If you were to analyze the first MCE filter, does that technique have a name?
A. This would be known as a direct. And when we get to this point, it turns into an indirect. So this is routinely used in air samples. But if you get a sample like this that's overloaded, you just don't throw the sample away because you may not be able to go back and reanalyze, because if it's this overloaded, it's scientifically impossible to analyze it in the TEM. So then you have to

go
18 through this step where you have it unloaded, and then it
19 goes into the TEM.
20 Q. So now, that MCE filter has whatever materials have
21 been ashed, are now analyzed in the microscope?
22 A. Yes.
23 Q. Okay.
24 A. So we sent these four cigarettes, we received back
25 filters that looked like this from the American Health
26 Foundation. We went through this process and got a nice
27 distribution and then we went into the TEM.
28 Q. And what happened when you went into the TEM?

1 A. We found that the filters were severely contaminated
2 with glass fibers.
3 Q. And what was the source of the glass fibers?
4 A. Well, we came to learn that the smoking machine uses
a
5 Cambridge filter that's made out of these glass fibers.
6 What we can figure out what happened is either the filter
7 was not removed when our filter was placed in there, or
8 there was so much residue in there, that it was impossible
9 to analyze. We couldn't go through the time and effort.
10 Q. If you had an infinite amount of time, would you
have
11 been able to analyze that?
12 A. Yes.
13 Q. Would you still be analyzing it now?
14 A. We would still be working on it four years later.
And
15 we stopped the analysis.
16 Q. And why would the presence of glass fibers make it
17 difficult to analyze for the asbestos? They don't look
the
18 same, do they?
19 A. These glass fibers are very close. You can, of
20 course, do other things in the TEM. You can do chemistry
21 and diffraction so you can rule out glass fibers, but when
22 you're dealing with hundreds and hundreds and hundreds of
23 fibers in fields of view, the time constraint is
impossible.
24 There's no physical way to do the analysis.
25 Q. So those were four cigarettes?
26 A. That were now, in our opinion, used up and the
27 experiment was invalid. So we lost four cigarettes.
28 Q. So what happened next?

1 A. In 1990, we did the scanning electron microscopy
2 analysis and the optical of these cigarettes just to show
3 what they looked like under the microscope, and then in
4 1991, we took the 1952 70-millimeter Kents that we had
5 received and did what's known as MAS-1.
6 Q. So the ones that we saw the pictures of, of the
7 unsmoked cigarettes, were from '55?
8 A. That's correct.
9 Q. And then you got 1952 cigarettes and were going to
10 smoke those?
11 A. Those were the ones that we used in our MAS-1, which
12 the paper we published is based on.
13 Q. And so why don't you explain what MAS-1 was?
14 A. We still wanted to do this experiment. We wanted to

see if crocidolite asbestos would be released from these original Kent cigarettes. The smoking machine consists essentially of a barrel-type apparatus that looks very similar to a syringe.
Q. Plaintiffs' Exhibit 87. Is this a smoking machine?
A. There's the two smoking machines we've used in these experiments.
Q. And can you explain which is which?
A. Those labels are labels we -- that were put onto them by our laboratory, so it didn't come with those, but the syringe on the top is essentially what was used in MAS-1, where we modified the tip of the syringe so it would hold the cigarette, and we also modified the inside using a different lubricant so it slid very easily.

And we lit the cigarette, collected the smoke, allowed the smoke to settle, and then we moved it, did an indirect analysis to see if any was released. We wanted to make sure that the experiments were done in our laboratory so we could monitor exactly what happened, and we wouldn't go through the problem we had with the American Health Foundation.
Q. Now, there's an object here that I'm pointing to with my pen in the middle of the smoking machine, and what is is that?
A. That is a glass barrel that the smoking machine uses to draw the puff, so it pulls a known amount of air through the cigarette, the cigarette is attached on the end. Maybe you can slide that down a little. The cigarette is attached on the end, and this is known as an automatic smoking machine.
The barrel is pulled back at set intervals, and there's a little filter sitting at the front where the cigarette is attached, where we've modified the whole one of our filters that collects the smoke, which consists of the tar and nicotines, and whatever, if any asbestos would come through.
MS. CHABER: I'd move 87 into evidence.
MR. OHLEMEYER: No objection, Your Honor.
THE COURT: May be admitted.
(Plaintiffs' Exhibit 87 received in evidence.)
MS. CHABER: Q. Now, you said you put a lubricant inside the modified syringe?
A. We put glycerol inside to coat the inside. One, it

would help hold the fibers if they attached to the surface and two, to make it easier to pull the syringe.
Q. What's that? This is Plaintiffs' 75.
A. That's the type of syringe that was used in what's known now as the MAS-1 smoking experiment. It's a B & D 30-cc syringe, and the end of the syringe was modified.
Q. And why was that necessary?
A. Well, the syringe is designed to hold a hypodermic

needle, which has a certain width to it. The filter of the cigarette is much wider, so Dr. Mark Rigler drilled the end out so it would easily hold the cigarette.

Q. Okay. I have some other pictures from the laboratory. This is 77. What's shown here?

A. It's a little out of sequence, but what we have here is after the cigarette was smoked, either on one or the second puff, the cigarette was removed, the syringe was filled with water, and we are trying to wash out any particulates that were caught. And in the end of the syringe, that little white object is the filter. It's the mixed cellulose ester filter that we would use to trap any inorganic particles that were present.

Q. Maybe what I should do is hand you these pictures, and you can put them sort of in the order of how it happened. 79, 80 and 78.

A. The one we have needs to fit in here.

Q. What are we looking at here?

A. We are looking at our smoking machine. We have the syringe. The syringe on the left has the cigarette that has

been attached to the syringe and then was sealed around the base between the cigarette and the syringe so there was no leakage of smoke.

And the one on the right-hand side is a cigarette that has been smoked one puff, and we have an aluminum cap that we placed over the top of the cigarette to distinguish it after one puff so we could collect whatever was released into the barrel on the one puff.

Q. Why is the cigarette vertical?

A. We felt that was the best way to do this, being it was a hand-held device and to hold it vertically to let the smoke come down and dissipate to the sides of the wall. That was our design.

Q. And why did you consider that the best design?

A. We were trying to capture the inorganic fibers in the smoke. We felt sitting vertically like that, it would dissipate better around the sides of the syringe.

Q. This is 79.

A. After the cigarette has been removed and the syringe has been allowed to stand for approximately 90 minutes to let all the smoke essentially precipitate out of the air so that there's no smoke still in the syringe, it's attached to the walls, or it's fallen to the bottom of the syringe. We then fill with water, and we are just washing out the insides of the syringe and capturing it on a filter that's on the bottom of the syringe.

Q. And why wouldn't you be able to use the direct method? Is this the indirect method, as well?

A. It's a modified indirect method. Because the smoke, as it comes out of the cigarette, just won't deposit straight down on the filter. Just like any smoke, it starts filling up the insides of the barrel. In order for us to measure everything that was released, we had to wash the entire insides of the barrel out. If we just tried to put a filter in the bottom or grids like we did do this, you get an uneven distribution and, plus, you miss everything that attaches to the sides of the barrel. So this was the only method that was, we felt, scientifically acceptable to measure everything released.

Q. And then this is 80.

A. And again, that's essentially the process of filtering out the water that's been mixed with the residue of the smoke particles.

Q. Now, this is 81. What's going on there?

A. Well, we are out of sequence.

Q. Of course.

A. This is the attachment of the cigarette to the syringe before we got to the smoking part.

Q. Okay. So I put the cart before the horse; is that what happened?

A. Yes.

Q. I apologize. Why is the person wearing gloves?

A. Well, two reasons. One, we knew we were dealing with crocidolite asbestos in these filters and we wanted to essentially keep them off our hands, and two, it just enables it to be a cleaner operation, so mostly for

contamination and health issues and the latter.

Q. Let's hope I did better on this sequencing, at least of these. What's happening there? This is 82.

A. The cigarettes were sealed to the syringe using a silicon material that hardens, but it doesn't harden to the point where you can't peel off. It's just a good sealant material. And this way, we wouldn't lose any smoke by chance coming around the filter.

Q. And 83?

A. Here the person is lighting the cigarette getting ready to pull the plunger to catch the smoke.

Q. And 84?

A. Here the plunger has been pulled back, and you can see that part of the cigarette has been smoked, and you can also see the smoke inside the barrel of the syringe. You'll notice how the smoke covers -- fills the entire portion of that barrel, so that any particulates in there, as it's settled out, would settle along the inside walls of the syringe. And again, that's why we would have to do the indirect, to make sure we captured everything that may have come out.

Q. Now, when the water was placed in the syringe, was any action done with it?

A. The syringe was shaken back and forth to help

distribute the particles, so when you do these types of analyses and you do filtering, you want the particles distributed very evenly through the solution, otherwise the filter may have higher or lower concentrations, depending on

where you sample the filter. So we shake it to make sure the particles are evenly distributed.
Q. Does that have a tendency to break up the asbestos?
A. No. Asbestos has a tensile strength greater than steel of the same size. This is a very durable material. They just don't break up.
MS. CHABER: I'd move into evidence, I think they run from 74 to 83.
MR. OHLEMEYER: Same objection, Your Honor.
THE COURT: All right. Overruled.
(Plaintiffs' Exhibits 74 through 84 received in evidence.)
MS. CHABER: If I missed one, I'll move it in later. Do they run to 84? Okay.
THE COURT: We will take the noon recess now.
Ladies and gentlemen, bear in mind the fact that you are not to form an opinion about the case and you are not to discuss the case, either amongst yourselves or with anyone else. If anyone attempts to discuss the case with you, please advise the Court of that fact. We are taking a shorter lunch period today because some people have to leave early, so please come back at 1:00 o'clock.
(Lunch recess taken.)
THE COURT: We are all together again, so you may resume your examination of the witness.
MS. CHABER: Thank you, Your Honor.
Q. Dr. Longo, talking about what you've referred to as MAS-1 --

A. Yes.
Q. -- and that was the test with the syringe?
A. Yes.
Q. Why did the syringe have to be modified?
A. Two reasons. One, the end of the syringe where the hypodermic needle goes had to be enlarged to fit the filter of the cigarette, and two, we wanted a better material inside the syringe, the glycerol, to lubricate it and help grab the particles that came out of the smoke.
Q. Would the glycerol or the lubricant that was inside have any effect on the sort of pulling action of the syringe?
A. It would make it easier.
Q. Did the length of time it took to get the cigarette into the syringe vary?
A. Yes, it did.
Q. How many cigarettes were tested in that MAS-1?
A. There were nine that were actually smoked; a total of 12 cigarettes, 9 of which were smoked.
Q. And what was the range of variation on the length of time it took to get the cigarette into the syringe?
A. I think some went as short as two to three seconds

to
23 the longest one was a minute and 47 seconds.
24 Q. Was there any manipulation of the cigarettes done
25 before they were smoked?
26 A. Yes, they were.
27 Q. And was that part of the protocol?
28 A. Yes.

1 Q. And why was that?
2 A. We wanted to simulate the actual -- what people
3 sometimes do with cigarettes is roll them between their
4 fingers, slightly pinching them, so we wanted to see if
that
5 had an effect on the release.
6 Q. Did you manipulate all nine?
7 A. Only six were manipulated in that fashion of the nine
8 smoked.
9 Q. With respect to the test data, is it known which ones
10 were manipulated and which ones weren't?
11 A. Yes.
12 Q. So if you get a result, you can find out what was
done
13 to that cigarette?
14 A. Yes, we can.
15 Q. Did you run any controls?
16 A. Yes, we did.
17 Q. And what's a control?
18 A. As we talked about earlier, because we are measuring
19 possible release of asbestos, crocidolite in this case, we
20 want to run controls on a cigarette, one that doesn't have
21 crocidolite, and two, laboratory controls to make sure
22 there's no contamination in the lab.
23 Q. So what did you do to control?
24 A. Well, we ran the tests in the exact same way using
new
25 cigarettes that didn't have crocidolite, and we also ran
26 without cigarettes, so we could just follow the process of
27 pulling the syringe and washing it out and doing
everything
28 but not smoking any cigarettes.

1 Q. Was there any asbestos found on any of the controls?
2 A. Well, interesting, the noncrocidolite cigarettes did
3 show some chrysotile asbestos, one or two fibers. The
4 controls in the lab with no cigarettes, we found no
5 asbestos. But no crocidolite was found in any of the
6 controls.
7 Q. Did you conclude where the one or two fibers of
8 chrysotile had come from in the cigarette that did not have
9 an asbestos filter?
10 A. We haven't been able to determine that. We know
it's
11 not in the lab. I don't know if I'm suggesting that it's
in
12 modern day cigarettes or not, but it wasn't from the lab.
13 Q. Now, all of the testing that's been done, has it all
14 been videotaped?
15 A. Yes and no.
16 Q. What what's the yes and what's the no?
17 A. Yes, we videotaped the opening of the original Kents
18 doing the analysis. We videotaped the MAS-1. MAS-2 for

one
19 cigarette we did not videotape. For the other two that we
20 tested, we videotaped.
21 Q. Why didn't you videotape the one?
22 A. At the time we tested it, we didn't have the
23 equipment. Just didn't think it was necessary.
24 Q. Have all those videotapes been provided to the
lawyers
25 for Lorillard and Hollingsworth and Vose?
26 A. Yes.
27 Q. How long, in total, are the times of the videotapes?
28 A. Altogether? Maybe three-and-a-half hours.

1 Q. And I think we've distilled it down to about six
2 minutes?
3 A. Yes.
4 Q. Okay.
5 MS. CHABER: This is Plaintiffs' 94. Your Honor, I'd
6 like to play this now.
7 MR. OHLEMEYER: I guess, Your Honor, for the record,
8 same objection.
9 THE COURT: Very well. Overruled.
10 MS. CHABER: I don't know if the objection is to my
11 using his equipment or the earlier stated one.
12 THE COURT: The exhibit.
13 MS. CHABER: Q. Dr. Longo, I'd like to have you
tell
14 us what we are seeing here. What's going on?
15 A. Sure. This is Jeannette Taylor, one of our
16 scientists, who was involved in those experiments, and she
17 just finished loading one of the cigarettes on to the
18 modified syringe. She's now placing a sealant around the
19 cigarette and the syringe to make it airtight at the
20 modified end.
21 Q. Are you able to tell at this point which cigarette
22 this is?
23 A. We did see the MAS number on there. If we backed up
24 we could, I believe.
25 Here it's been lit and the syringe is being pulled
26 back. It's approximately 35 cc's of air was drawn into
the
27 syringe with the smoke from the cigarette from the
original
28 Kent.

1 Q. Was that the puff simulation, the pulling back?
2 A. Yes.
3 Q. And now what's this?
4 A. Here we see this is one of the cigarettes in which we
5 did the manipulation beforehand. Now, the cigarette's
being
6 placed into the syringe. As we saw earlier, the cigarette
7 earlier went in a little faster. This one is taking some
8 time.
9 Q. Is this one of the longer ones?
10 A. Not the longest, but longer.
11 Q. Are you able to say which cigarette this one is?
12 A. I can't quite read it. That was one of the rolled,
so
13 it was either MAS-3 -4 or -6.
14 And again, here's another one. And these are just

15 demonstrations. Now the cigarette is being again rolled
16 with inflexion and being placed into the syringe again.
17 Q. Where does that one fall within the range, in terms
of
18 the length of time?
19 A. I believe this was -- may have been the 47-second
one.
20 Maybe sooner. It's one of the higher ones.
21 A. Again, here's another one. We are just showing how
22 it's being put in. Jeannette Taylor, who was doing these
23 experiments, pushing the cigarette in, was under the
24 instruction not to force these cigarettes in, so some took
25 longer than others so that we could ease them in without
26 doing damage to the filter.
27 Q. Was the videotape done by a professional
videographer?
28 A. No, this was done by, in this case here, Dr. Rigler

1 was doing the videotape.
2 Q. And do you have any criticisms of the videotape?
3 A. I don't have any criticisms of the technical parts of
4 the videotape. I would have liked it maybe if there had
5 been a little bit less of talking on the videotape. And in
6 one instance, we had a young analyst who actually laughs on
7 the videotape, and that's kind of embarrassing. There's
8 nothing wrong technically, but it would have been nicer if
9 he didn't laugh. I think that's a little bit
10 unprofessional, so I talked to him about that.
11 This would have been the longest cigarette here.
This
12 is one of the last ones. And actually, this was the
longest
13 one. I believe if we watch this, this was a minute and 47
14 seconds for Jeannette to put the cigarette into the
syringe.
15 Q. So that was the longest one?
16 A. I believe so.
17 Q. Is that the last one?
18 A. Yes. it's not quite done yet.
19 Q. Okay. Is she forcing the cigarette in?
20 A. No. She has these gloves on that make it a little
21 awkward to hold the cigarette, and she's been instructed
not
22 to force them, and that's why some take longer than
others.
23 Q. And all of this was being timed on a clock that's in
24 the background?
25 A. Yes. And that's the end of it for that cigarette.
26 Q. Is that the end of the tape?
27 A. Of the MAS-1, yes.
28 Q. Now, after it was smoked, it was left for 90
minutes?

1 MR. OHLEMEYER: Objection, Your Honor. I realize we
2 are trying to save some time, but it is leading.
3 THE COURT: Restate the question.
4 MS. CHABER: Q. How long was it left for after it
5 was smoked?
6 A. Each cigarette had two puffs. After the first puff,
7 it was allowed to stay in vertically for 90 minutes to let
8 the smoke dissipate before the washing, washout, and then

you would put it on for the second one.
Now, the second one may have been done right away or it may have been done sometime after, but each time after the initial puff it was allowed to stay in for 90 minutes, so each cigarette had two puffs taken.
Q. And was there cigarette left after the two puffs?
A. Yes, quite a bit.
Q. And why was it that you didn't do more puffs than just two?
A. We wanted to measure what was released in the first two puffs, and since the smoking machine that we used was not automated, we would have had to have done this time after time after time. It was just too prohibitive.
Q. The three groups of three for the total of nine --
A. Yes.
Q. -- cigarettes smoked, were those all identified in the course of this process?
A. Yes.
Q. And you're able to -- are you able to track each of the cigarettes and then what results came from them?

A. Yes, if we looked at the whole tape, we could follow each one individually. We just took excerpts out to show how it was done.
Q. Now, at some point, you counted fibers?
A. Yes.
Q. And did you use any standards or protocols in counting the fibers?
A. We went through the indirect process, and then we prepared the samples.
(End of Volume 1 for August 18, 1995.)